

HP ProLiant

Application Storage Manager user guide

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Application Storage Manager user guide

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About this document

The document describes the HP ProLiant Application Storage Manager (ASM) software, including how to use the ASM storage-allocation wizards to set up storage on an HP ProLiant Storage Server, and how to manage and monitor storage through the ASM user interface.

For easy access, this document is produced as a printable document (PDF) and shipped on the HP ProLiant iSCSI Feature Pack documentation CD; however, all user information is also part of the ASM online help system, accessible from the ASM main menu. To learn more about this guide and about related product documentation, refer to the following sections:

- [Intended audience](#)
- [Prerequisites](#)
- [Related documentation](#)
- [Document conventions](#)

Intended audience

This document is intended for network and storage administrators who are experienced with Microsoft Exchange Server 2003 (Exchange Server), Microsoft SQL Server 2000 (SQL Server), or other types of application servers hosted by ASM. In addition, this guide assumes some basic knowledge of networking protocols (such as the iSCSI protocol) and some familiarity with storage administration concepts (such as volumes, logical disks, and physical disks).

Prerequisites

Before you use ASM with iSCSI Feature Pack, complete the following:

- Obtain your iSCSI license keys (see the printed License Key Entitlement Certificate that came with the HP ProLiant Storage Server iSCSI Feature Pack product).
- Install the HP ProLiant Storage Server iSCSI Feature Pack software (with ASM) on your HP ProLiant Storage Server. To do this, follow the instructions in the *HP ProLiant Storage Server iSCSI Feature Pack quick setup guide*.



NOTE:

If you are planning to use ASM with a client application, you must install the ASM agent on the application server.

Related documentation

For more information about the iSCSI Feature Pack or ASM, refer to the following publications, which are shipped on the documentation CD with the iSCSI Feature Pack product:

- *HP ProLiant Storage Server iSCSI Feature Pack quick setup guide* (T3669-90909)
- *HP ProLiant Storage Server iSCSI Feature Pack user guide* (T3669-90907)

For more information about HP storage offerings, go to one of these sources:

- HP StorageWorks products <http://www.hp.com/storage>
- HP ProLiant Storage Server (NAS) products <http://www.hp.com/go/nas>

Document conventions

Table 1 Document conventions

Convention	Element
Bold	Menu items; buttons; and key, tab, and box names
<i>Italics</i>	Text emphasis and document titles in body text
Monospace font	User input, commands, code, file and directory names, and system responses (output and messages)

1 Overview

HP ProLiant Application Storage Manager (ASM) simplifies the steps required to administer storage on HP ProLiant Storage Server (NAS) devices. The ASM software works with the HP iSCSI Feature Pack to enable block-storage services for client applications, such as Microsoft Exchange Server 2003, Microsoft SQL Server 2000, and other user-defined application servers. In addition, ASM provides an easy way to monitor and manage space for application-based storage, plus a way to create, consolidate, and monitor file-based storage through shared folders on your storage server.

To create storage space, ASM provides storage-allocation wizards to walk you through the process of hosting storage on your storage server. [Figure 1](#) shows how one of these wizards helps you configure Exchange Server storage groups. Other interfaces are provided to help you set up SQL Server storage, storage for user-defined applications, and storage for shared folders.

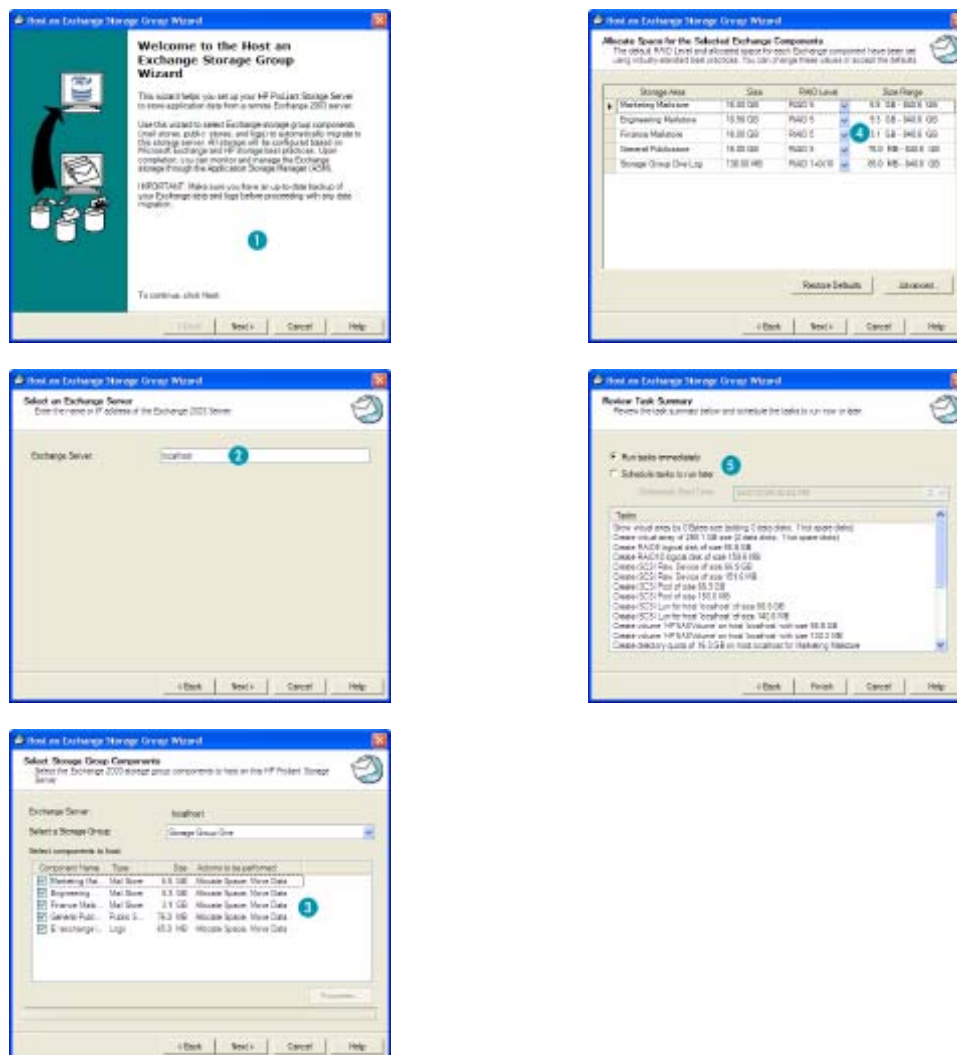


Figure 1 Host an Exchange Storage Group Wizard

1. Start the wizard.
2. Enter the name of an Exchange Server.

3. Select storage groups components.
4. Specify storage size and RAID Level.
5. Schedule data migration to the storage server.

Facts about ASM

ASM can be installed on most HP ProLiant Storage Server platforms (see [Installation](#)). Be aware of the following prerequisites:

- [Software support](#)
- [Hardware support](#)

Installation

ASM is installed and licensed as part of the HP ProLiant Storage Server iSCSI Feature Pack (Standalone Edition). For information about installation steps, see *HP ProLiant Storage Server iSCSI Feature Pack quick setup guide*.



IMPORTANT:

Obtain license keys for the iSCSI Feature Pack from HP before you begin the installation. See the License Key Entitlement Certificate that came with the iSCSI Feature Pack product.

Software support

ASM runs on a Microsoft Windows platform and requires Windows Storage Server 2003 to be installed on the HP ProLiant Storage Server. ASM provides storage-management services for the following applications:

Table 2 Software support

Microsoft Exchange Server 2003	See Using the Host an Exchange Storage Group Wizard .
File sharing services on local storage	See Using the Create a Shared Folder Wizard .
Microsoft SQL Server 2000	See Using the Host a SQL Server Database Wizard .
User-defined applications	See Using the Host a User-Defined Application Wizard .

iSCSI initiators

ASM requires Microsoft iSCSI Initiator 1.06. To learn more about this software, go to <http://www.microsoft.com> and search for *iSCSI initiator*.

Hardware support

ASM supports these HP ProLiant Storage Server platforms:

- HP ProLiant ML110 Storage Server
- HP ProLiant ML110 G2 Storage Server
- HP ProLiant DL100 Storage Server
- HP ProLiant ML350 G4 Storage Server
- HP ProLiant ML370 G4 Storage Server
- HP ProLiant DL380 G4 Storage Server (Base, External SCSI, and External SATA models)
- HP StorageWorks NAS 500s
- HP StorageWorks NAS 1500s
- HP StorageWorks NAS 2000s



NOTE:

ASM does not expand logical disks on HP ProLiant ML110 storage servers or HP ProLiant DL100 storage servers. These systems are pre-configured with one volume. Additionally, ASM does not expand volumes on dynamic disks, or expand the underlying LUN or logical drive of a dynamic disk.

Benefits of iSCSI

The Internet Small Computer System Interface protocol (iSCSI) has several advantages over more costly high-end fibre-channel technologies or older Ethernet communications protocols. Like an ordinary SCSI interface, iSCSI is standards-based and efficiently transmits block-level data between a host computer (such as an Exchange Server or SQL Server) and a target device (such as iSCSI-enabled HP ProLiant Storage Server). However, as the *internet* part of the iSCSI name implies, iSCSI communication is not limited by distance, performing block-level I/O over IP networks.

Since iSCSI runs over an Ethernet network, you can install and maintain the HP iSCSI Feature Pack solution without investing in expensive fibre channel topologies or retraining administrators to use a new SAN infrastructure. With the aid of ASM, it is easy to grow iSCSI storage over time, and to monitor and maintain your existing storage.

Since the iSCSI functions without distance or size limitations, iSCSI storage networks can be local area networks (LANs) or wide area networks (WANs). Combined with the NAS storage capability of HP ProLiant Storage Servers, iSCSI protocols can extend shared storage capabilities to include file, print, and block serving for network applications and users across your organization.

Storage management infrastructure

The purpose of ASM is to simplify storage management, so that you do not need to understand the complexities of increasing or decreasing storage allocation. ASM handles two types of use models:

- [Managing storage for shared folders](#)
- [Managing storage for application servers](#)

Managing storage for shared folders

With ASM, you can set up and monitor shared folders or *file shares*. As part of this process, the Create a Shared Folder Wizard helps you create shared folders on the HP ProLiant Storage Server. The wizard suggests a default storage size for each shared folder, plus a default RAID Level. You can customize both of these defaults.

In addition to helping you create new shared folders, ASM discovers any top-level shared folders on the storage server during setup and afterwards on an ongoing basis. After discovery, ASM monitors all top-level shared folders (both discovered and created).

Shared folders reside on a volume mapped to a logical disk or LUN in the storage server's virtual array, as shown in [Figure 2](#). Physical disk storage can be either internal storage or external JBOD disks, which are attached to the server's controller card by an iSCSI cable. After shared folders are created, communication between client and host takes place over the Microsoft Common Internet Filesystem protocol or CIFS.

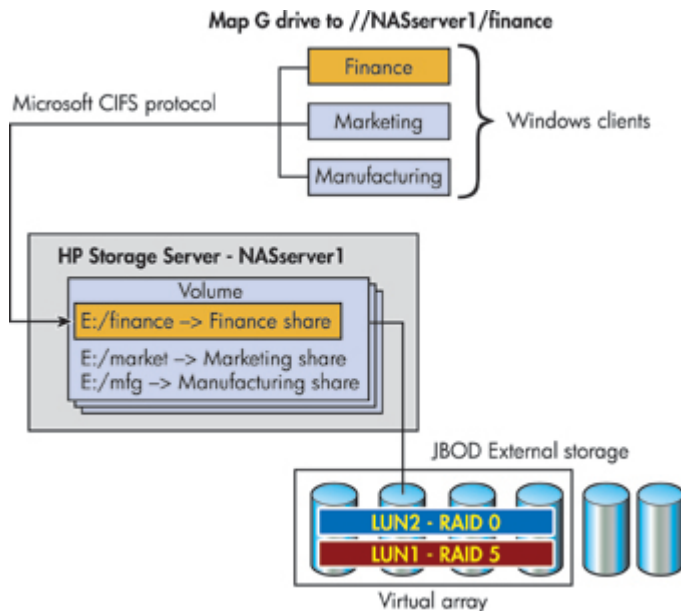


Figure 2 Shared folder data model

Managing storage for application servers

With ASM, you can allocate and monitor storage for applications residing on remote application servers, such as Exchange Servers, SQL Servers, or user-defined application servers. To do this, you must install an ASM agent on the remote application server in addition to installing the iSCSI Feature Pack with the ASM program on your HP ProLiant Storage Server.

For this type of configuration, the volume and logical disk reside on the application server (or iSCSI client), which communicates with the storage server (or iSCSI target) as shown in [Figure 3](#). Storage is provided in the storage server through an iSCSI LUN, which points to RAID-formatted LUNs on the physical disks.

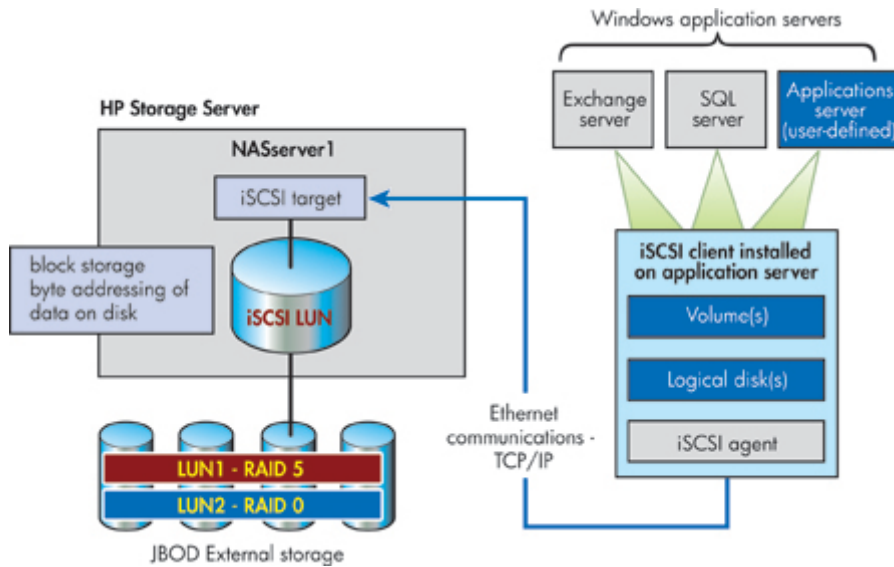
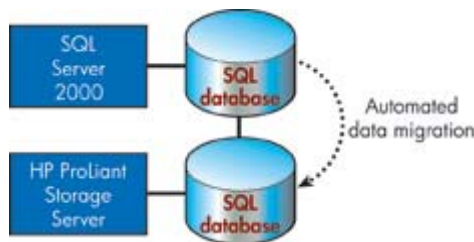


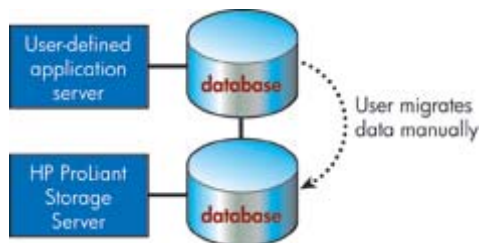
Figure 3 Application data model

Managed applications and automated data migration

ASM provides automated data migration for some types of applications, but not for others. *Managed applications*, such as Exchange Servers and SQL Servers, are applications in which ASM can discover storage components and knows how to store them. At your request, ASM can automatically migrate data from the application server to the HP ProLiant Storage Server, as shown in the SQL Server example below.



To provide additional storage-management options, ASM also supports *user-defined applications* and shared folders. User-defined applications can be any remote application that runs under Windows Server 2003 and uses NTFS volumes for storage. ASM cannot automatically migrate the data for user-defined applications or shared folders. Therefore, you must manually migrate the data or transfer it using a process outside ASM's control, as shown in user-defined application example below.



About the user interface

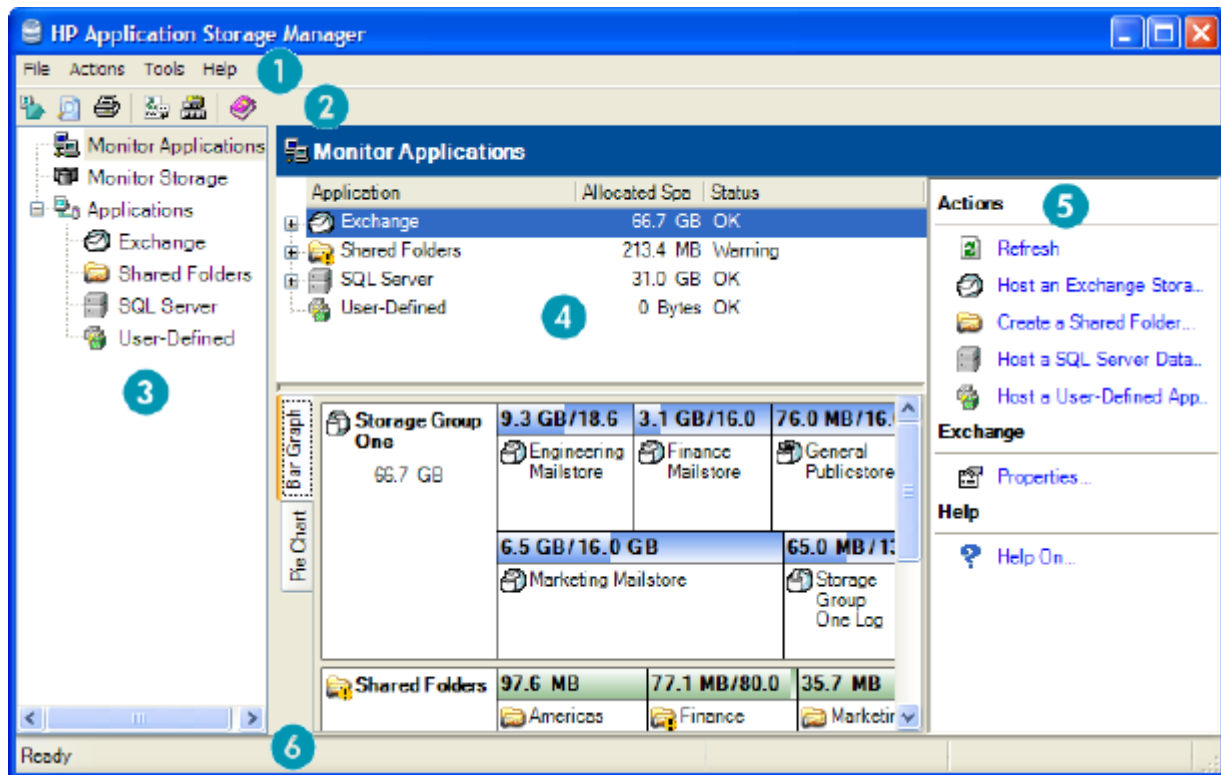


Figure 4 ASM Main window

1. Menu bar
2. Toolbar
3. Navigation pane
4. Content pane
5. Actions pane
6. Status bar

Menu bar and toolbar

ASM menu bar

The menu bar, located at the top of the [ASM Main window](#), provides these menus: file, actions, tools, and help.

Table 3 Menu bar quick reference

Menu	Item	Description
File menu	Export to Excel	Exports the information in the content pane to an Excel spreadsheet.
	Page Setup	Lets you set options that control the appearance of printed sheets.
	Print Preview	Displays how the data in the content pane will look when printed.
	Print	Prints the content pane as currently displayed.
	Exit	Exits ASM.
Actions menu	Allocate Space	Opens the Allocate Space page to help you change the storage space for the current selection. This item is available only when you select an application or storage component that you can change: for example, <i>Mailstore 1</i> under Applications>Exchange.
	Remove From View	Removes a component from view but does not delete or migrate data. This item is available only when you select a storage component that can be removed: for example, <i>Mailstore 1</i> under Applications>Exchange.
	Properties	Displays all properties associated with the current selection. This item is available only when you highlight a component with an associated Properties menu.
	Refresh	Refreshes the content pane.
	Any one of the following items: <ul style="list-style-type: none">• Host an Exchange Storage Group• Create a Shared Folder• Host a SQL Server Database• Host a User-Defined Application	Opens a storage-allocation wizard to set storage size and RAID Level for item you have selected in the navigation pane: for example, Applications>Exchange.
Tools menu	Task Viewer	Opens the Task Viewer, where you can view the status of current tasks, errors, and task history.
	Options	Displays the Options window, where you can change color and scaling settings.

Menu	Item	Description
Help menu	Help on	Opens an online help topic for the selected item.
	Contents	Opens the online help Table of Contents.
	About Application Storage Manager	Displays the current user interface components and program copyright statement.

ASM Toolbar

The toolbar, located just below the menu bar in the [ASM main window](#), provides icons for accessing commonly-used commands.

Table 4 Toolbar quick reference

Item	Description
Export to Excel	Exports the information in the content pane to an Excel spreadsheet.
Print Preview	Displays how the data in the content pane will look when printed.
Print	Prints information in the content pane.
Task Viewer	Opens the Task Viewer, where you can view the status of current tasks, errors, and task history.
Options	Displays the Configure Options window, where you can change color and scaling settings.
Help Contents	Displays the online help Table of Contents.

Navigation and content pane

The navigation pane, located on the right side of the [ASM Main window](#), allows you to select different applications and storage areas to monitor or configure. Select an application in the navigation pane (left pane) to see its monitoring data in the content pane (center pane).

Table 5 Navigation pane quick reference

Item	Description
Monitor Applications	Displays an <i>application-centric</i> view of all application storage.
Monitor Storage	Displays a <i>storage-centric</i> view of the storage-to-application relationship.
Applications	Displays a selectable list of all applications that are available to be managed and monitored.
Exchange, Shared Folders, SQL Server, User-Defined	Displays detailed storage information for the application selected.

Actions pane

The actions pane, located on the right side of the [ASM Main window](#), provides a list of actions, based on your current selection. Along with other selectable items, the actions pane provides access to storage-allocation wizards and the Allocate Space page, which help you configure storage. Select

an application in the navigation pane (left pane) to see its corresponding wizard in the actions pane (right pane).

Table 6 Actions pane quick reference

Action	Description
Refresh	Refreshes the content pane.
Any one of the following items: <ul style="list-style-type: none">• Host an Exchange Storage Group• Create a Shared Folder• Host a SQL Server Database• Host a User-Defined Application	Opens a storage-allocation wizard to set storage size and RAID Level for the item you have selected: for example, Applications>Exchange.
Allocate Space	Opens the Allocate Space page to help you change the storage space for the current selection. This item is available only when you select a storage component that you can change: for example, <i>Mailstore 1</i> under Applications>Exchange.
Remove from View	Removes a component from view but does not delete or migrate data. This item is available only when you select a storage component that you can remove: for example, <i>Mailstore 1</i> under Applications>Exchange.
Properties	Displays all properties associated with the current selection. This item is available only when you select a component with an associated Properties menu.
Help On	Opens an online help topic for the item you have highlighted.

Defining user options for the ASM interface

ASM provides a way to customize the following settings in your user interface:

- Color settings (see [Changing color settings](#))
- Scaling settings (see [Scaling display settings](#))

Changing color settings

Changing color settings customizes the color of items in the content pane to help distinguish them from each other.

1. From the menu bar, select **Tools>Options**.
The Configure Options window opens.
2. Click the **Color** tab.
3. Select an item in the Items list and a color in the drop-down Color list.
4. When the color selections are complete, click **Apply** to apply the color settings to the content pane.
5. Click **OK**.

Scaling display settings

Scaling changes the display proportions of your logical disks and volumes, and application areas in the content pane.

1. From the menu bar, select **Tools>Options**.

The Configure Options window opens.

2. Click the **Scaling** tab.
3. Change the storage-display proportion settings in the following ways:
 - According to capacity, using logarithmic scaling—Displays logical disks and volumes, and application-storage components according to an algorithm based on logarithmic units, but leaves the display readable if areas are too small.
 - According to capacity, using linear scaling—Displays logical disks and volumes, and application areas in relative proportions, but leaves the display readable if areas are too small.
 - All as the same size—Displays logical disks and volumes, and application areas as the same size.
4. Click **Apply** to apply the scaling settings to the content pane.
5. Click **OK**.

2 Hosting storage for applications and shared folders

ASM provides a simplified interface to host application data and shared folders on your HP ProLiant Storage Server, using storage-allocation wizards.

Use storage-allocation wizards to configure storage for these applications:

Application	Description	For more information
Exchange	Configure storage for Exchange Server storage groups. A wizard assists you by discovering Exchange Server storage group components (such as mail stores, public stores, and logs), suggesting default storage allocations based on best practices for Exchange Server, and migrating the Exchange Server components you selected to your HP ProLiant Storage Server.	See Using the Host an Exchange Storage Group Wizard .
Shared Folders	Set up shared folders on your storage server. A wizard assists you by creating or expanding the underlying storage required for shared folders based on the input you provide.	See Using the Create a Shared Folder Wizard .
SQL Server	Configure storage for SQL Server databases. A wizard assists you by discovering SQL Servers and database components (such as data files and logs), helping you configure SQL Server storage based on best practices for SQL Server, and migrating the SQL Server components you selected to your storage server.	See Using the Host a SQL Server Database Wizard .
User-Defined Applications	Configure storage for any remote application running under Windows Server 2003 that uses NTFS volumes for storage. This wizard creates a remote volume of the size you specify on the application server and sets up storage for this volume on your storage server. This storage is configured to use iSCSI protocols and available for your use.	See Using the Host a User-Defined Application Wizard .

After you have configured storage for an application using a storage-allocation wizard, you can easily update storage space for any storage component (see [Allocating or updating storage space](#)).

Allocating or updating storage space

Use the Allocate Space page to set the storage space for applications and shared folders, as shown in [Figure 5](#).

You can access the Allocate Space page from any of the storage-allocation wizards. After you have initially configured storage for an application, you can increase or decrease the storage size of any application component by accessing Allocate Space page in a standalone mode; however, you cannot modify the RAID Level for an individual storage component after overall application storage has been configured.

To manually open the Allocate Space page, do one of the following *after* you have initially configured application storage:

- Right-click any storage component in the content pane and select **Allocate Space**.
- Select any component in the content pane and select **Actions>Allocate Space**.
- Select any component in the content pane and select **Allocate Space** in the actions pane.

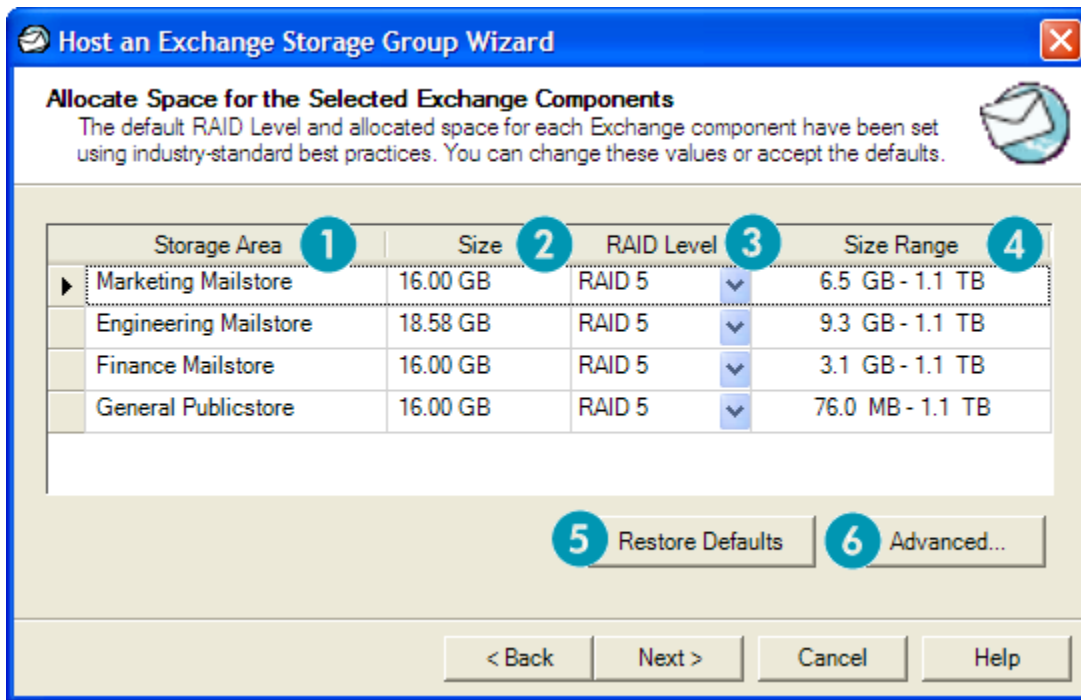


Figure 5 Allocate Space page

1. Storage component
2. Increase/decrease storage size
3. RAID Level
4. Minimum/maximum size for this component
5. Reset all values to defaults
6. Customize storage allocations



IMPORTANT:

For managed applications where storage recommendations are known (such as Exchange Server and SQL Server), ASM provides default values based on HP ProLiant Storage Server best practices and specific storage recommendations for application components. If you do not require additional customization, you can safely accept these defaults (recommended). For user-defined applications or for shared folders, the system provides default values that you can change.

To modify the default values, follow these steps:

1. Select a row to edit.
2. In the Size column, do the following:
 - Click in the column to activate the arrow. Set the size unit from the drop-down list: megabytes (MB), gigabytes (GB), or terabytes (TB).
 - Enter the storage size. For example, to increase the storage size for a shared folder from 10 GB (the default) to 20 GB, enter the number **20** in the space provided.

**NOTE:**

The Size Range column shows the minimum and maximum storage space that can be allocated to a component. Whenever you change Size or RAID Level, the maximum value for Size Range is recalculated for all other storage components shown.

3. Verify or change the RAID Level (if available) for the component (see [Customizing RAID Levels](#) for more information).

**NOTE:**

After you have initially set the RAID Level for an application component (such as an Exchange Server storage group or a SQL Server database), you cannot change the RAID configuration; therefore, the RAID Level is not shown.

4. If necessary, click **Restore Defaults** to restore all values in the table to the window's default values.
5. If necessary, click **Advanced** to further customize the configuration of individual storage attributes. For more information about the Advanced window, see [Setting advanced storage allocations](#).
6. When finished, click **Next**. If you requested an increase in storage capacity that requires the storage to be re-configured, you may see a warning (see [Capacity warning messages](#)).

For more information about allocating space for specific applications, go to:

Exchange Server	Allocating space for Exchange Server storage group components
Shared folders	Allocating space for a shared folder
SQL Server	Allocating space for SQL Server database components
User-defined applications	Allocating space for user-defined applications

Capacity warning messages

Table 7 Capacity warning messages

Message	Action
Capacity Requires Logical Disk Growth	The storage allocation that you requested requires ASM to grow one or more logical disks on the system. This operation cannot be undone in this wizard. Click Yes to continue; click No to modify the storage allocation.
Capacity requires Virtual Array Growth	The storage allocation that you requested requires ASM to grow one or more virtual arrays on the system. This operation cannot be undone in this and is very time consuming (possibly several hours). Click Yes to continue; click No to modify the storage allocation.

Setting advanced storage allocations

Use the Advanced window to configure the attributes of individual storage components beyond the default values that ASM provides. Values in the Advanced window are dependent upon each other. For example, if you change RAID Level or Exclusive storage, you might notice that the maximum size value under Size Range dynamically changes since your overall storage allocations have been re-configured. If you change the Hot Spares value, you might also notice a change under Size Range.

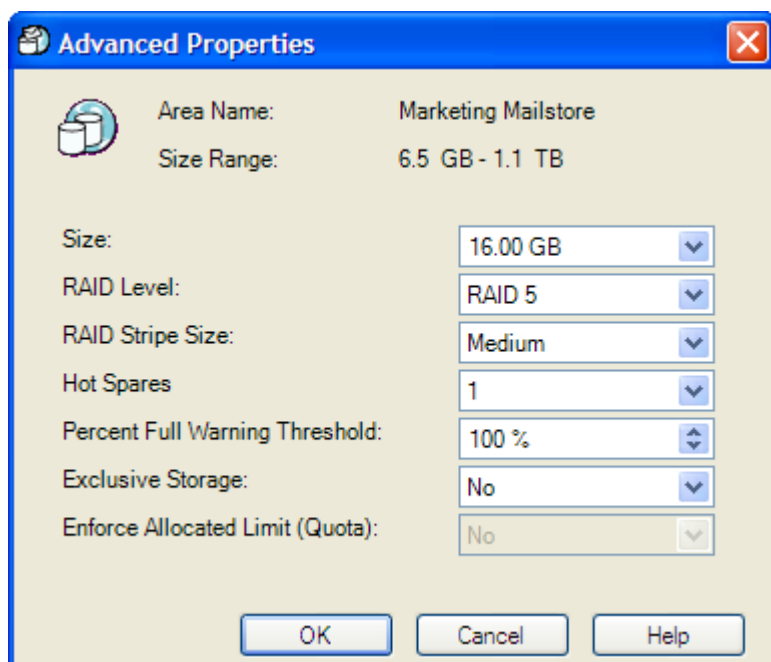


Figure 6 Advanced window

The table below provides a brief description of the items you can modify:

Table 8 Advanced window items

Item	Description	Notes
Size	The amount of storage that ASM allocates for the component you are configuring.	For managed applications (such as Exchange Server and SQL Server), you are prevented from setting Size below a minimum default value; this minimum value ensures successful data migration to the HP ProLiant Storage Server.
RAID Level	Disk formatting to provide different levels of performance and fault tolerance across physical disks. After you have initially set the RAID Level for an application component (such as an Exchange Server storage group or a SQL Server database), you cannot change the RAID configuration.	For more information about RAID Levels, see Customizing RAID Levels .*
RAID Stripe Size	The number of bytes or kilobytes to be <i>striped</i> across RAID disks.	The values available for RAID stripe size depend on the type of controller managing your disks. Since these values vary significantly between controllers, ASM provides the following general values: small, medium, and large.*
Hot Spares	A disk drive to be held in reserve in case of disk failure.	The values for hot spares are either 0 (do not reserve a disk), 1 (reserve a single disk) or 2 (reserve two disks).*

Item	Description	Notes
Percent Full Warning Threshold	Sends a warning to indicate when storage use is about to surpass the percentage you enter. For example, if you enter 80%, you see a warning (yellow asterisk) in the content pane when storage is at 80% full.	The percent full warning threshold is set by default to 100%.
Exclusive Storage	Uses separate, dedicated physical disk drives for the storage component, which cannot be used for any other storage.	For managed applications, such as Exchange Server and SQL Server, ASM default values specify an exclusive disk for log files, which according to storage best practices, should be isolated from other application storage areas.*
Enforce Allocated Limit (Quota)	Sets an enforced quota for the amount of storage available for local storage on the storage server.	This item is only available for shared folders. See Enforcing an allocated storage limit for shared folders .

*After you have initially configured storage for an application, you can increase or decrease the storage size; however, you cannot modify the RAID Level, RAID Stripe Size, Hot Spares, or Exclusive Storage for an individual storage component.

Customizing RAID Levels

Depending on the level selected, RAID disk formatting provides different kinds of performance and fault-tolerance across logical disks. Before you customize the default RAID Levels that the wizard provides, you should be thoroughly familiar with RAID capabilities and understand the performance trade-offs of various RAID Levels.

Unless you customize the RAID option, the wizard configures each logical disk (or LUN) with the default RAID Level shown the Allocate Space page:

- For managed applications, such as Exchange Server and SQL Server, the wizard suggests a RAID Level based on HP ProLiant Storage Server best practices and specific RAID recommendations for application components. For example, the default RAID configuration for Exchange Server 2003 log files is RAID1+0(10). You should accept these defaults.
- For user-defined applications and shared folders (where industry-standard recommendations cannot be determined), the system provides a default RAID value (usually RAID5) that you can customize.

The table below summarizes the RAID options you can configure using ASM:

Table 9 RAID options

RAID Level	Description
RAID0 – No Fault Tolerance	Offers the greatest capacity and performance without data protection. RAID0 provides data striping but no fault tolerance. If you select this option for any of your logical drives, you will experience data loss for that logical drive if one physical drive fails. However, because no logical drive capacity is used for redundant data, this method offers the best processing speed and capacity. You may consider assigning RAID0 to drives that require large capacity and high speed, but pose no safety risk.
RAID1+0(10) – Drive Mirroring	Offers the best combination of data protection and performance. RAID1+0(10) or drive mirroring creates fault tolerance by storing duplicate sets of data on a pair of disk drives. There must be an even number of drives for RAID1+0(10). This is the most costly fault tolerance method because it requires 50 percent of the drive capacity to store the redundant data. RAID1+0(10) first mirrors each drive in the array to another, and then stripes the data across the mirrored pair. If a physical drive fails, the mirror drive provides a backup copy of the files and normal system operations are not interrupted. The mirroring feature requires a minimum of two drives and, in a multiple drive configuration (four or more drives), can withstand multiple simultaneous drive failures, as long as the failed drives are not mirrored to each other.
RAID5 – Distributed Data Guarding	Offers the best combination of data protection and usable capacity. RAID5 stores parity data across all the physical drives in the array and allows more simultaneous read operations and higher performance than data guarding (RAID4). If a drive fails, the controller uses the parity data and the data on the remaining drives to reconstruct data from the failed drive. The system continues operating with a slightly reduced performance until you replace the failed drive. RAID5 requires an array with a minimum of three physical drives. The capacity of the logical drive used for fault tolerance depends on the number of physical drives in the array. For example, in an array containing three physical drives, 33 percent of the total logical drive storage capacity is used for parity data; a 14-drive configuration uses only 7 percent.
RAID ADG – Advanced Data Guarding	Available only if the controller has an enabler. RAID ADG is a fault-tolerance method that provides the highest level of data protection. It is similar to RAID5 in that parity data is distributed across all drives in the array, except that multiple separate sets of parity data are used in RAID ADG, and the capacity of multiple drives is used to store the parity data. Simultaneous failure of several drives is thereby tolerated in RAID ADG, whereas RAID5 can only sustain failure of a single drive. The fault-tolerance of RAID ADG configurations is higher than RAID1+0 configurations, since in RAID1+0 configurations there is a chance that two drives mirrored to each other will fail simultaneously. RAID ADG read performance is similar to RAID5, since all drives can service read operations, but the write performance is lower than that of RAID5 because the parity data must be updated on multiple drives. Performance is reduced further in a degraded state. RAID ADG requires an array with a minimum of 2+P physical drives, where P is the number of drives used to store parity data; normally, P=2. The percentage of the total drive capacity used for fault tolerance is equal to the number of drives used for parity data divided by the total number of physical drives. For example, in an array of five physical drives that has two parity drives, 40 percent of the total logical drive storage capacity is used for fault tolerance. A 14-drive configuration, that also has two parity drives, uses only 14 percent of storage capacity for fault tolerance. Some controllers may not support this option.

Setting a warning threshold for storage components

To receive a warning when storage capacity reaches a specified limit, set the *percent full warning threshold*. You can set a warning threshold for any storage component that ASM manages, including Exchange Server mail stores, public stores, and logs; SQL Server databases and logs; remote iSCSI volumes for user-defined application, or shared folders.

By default the warning threshold is set to 100% for all application components. To modify this setting, do one of the following:

- In the Advanced window of any storage-allocation wizard, modify the percent full warning threshold value. See [Setting advanced storage allocations](#).
- Under the Properties menu for any storage component, click the Warning Threshold tab. See [Accessing application properties](#).

After you set a warning threshold, ASM changes the status indicator for the component when this threshold has been surpassed. This is a warning only; no hard limits are enforced on storage capacity; however, you can use this warning to trigger an administrator notification, if required. The warning is visible in these places:

- In the content pane of the main window. The status for the storage component changes to Warning and a yellow warning icon appears next to the component name on the bar graph (see [Warning icon](#)).
- As an *alert* in the Properties window.



Figure 7 Warning icon



NOTE:

For shared folders, you can set an enforceable limit (or quota) for allocated storage, as well as a warning threshold. For more information, see [Enforcing an allocated storage limit for shared folders](#).

Scheduling storage-allocation tasks

Use the Review Task Summary page to view a list of tasks to be performed as each storage component (such as a SQL Server data file, or an Exchange Server mail store or public store) is migrated to your HP ProLiant Storage Server.

- To make configuration changes, click **Back**.
- To run tasks immediately, click **Finish**.
- To schedule tasks for later time, select **Schedule tasks to run later**, set the scheduler start time, and then click **Finish**.

Viewing task completion status

The Task Viewer shows the status of the tasks as ASM configures storage and migrates the component to your HP ProLiant Storage Server, if possible.

- To manually open the Task Viewer, select **Tools>Task Viewer** from the menu bar.
- If detailed processing information is not already shown, click **Details**.

The Task Viewer has three tabs, each with a different kind of information about task-completion status:

- **Current Session**—Displays the tasks that are currently being processed, the list of tasks in the queue, and all tasks that have been completed in the current session, including task status:
 - **Scheduled**—The task has been scheduled to run at a specified time.
 - **Verifying**—ASM is confirming that the configuration you specified is valid.
 - **Ready**—The task is waiting on the completion of the previously scheduled task so it can be processed.
 - **Running**—The task is currently being processed.
 - **Completed**—The task is finished without problems.
 - **Cancelling**—The task is in the process of being cancelled.
 - **Cancelled** — The task has been cancelled (see [Cancelling tasks](#)).
 - **Failed**—An error occurred during processing; go to the Errors tab for detailed information about the failure.
- **Errors**—Provides information about any problems that have occurred during processing.
- **Task History**—Details the execution of tasks in chronological order, including the start date and the end date for each task, and whether or not the task has completed successfully.

Cancelling tasks

- To cancel any task that has not yet been completed, select the task to be cancelled, and then click **Cancel Task**. Only the selected task is cancelled.
- To cancel all tasks, click **Cancel All**.

Cancelled tasks may not immediately cancel. They need to reach a logical stopping point since the state of the underlying storage may be affected.

Using the Host an Exchange Storage Group Wizard

The Host an Exchange Storage Group Wizard automatically discovers the Exchange Server storage groups in your network domain and helps you allocate storage space for these components:

- **Mail stores**—Contain the data in user mailboxes.
- **Public stores**—Contain the data in public folders.
- **Logs**—Provide a record of every message stored in a storage group.

After it discovers Exchange Server storage groups, the wizard helps you configure storage based on Exchange Server and HP storage best practices, and migrates the data you requested to your HP ProLiant Storage Server.

Before you begin configuring storage for Exchange Server

- Make sure the ASM agent has been installed on each Exchange Server with data you plan to migrate. To learn how to install the ASM agent on your Exchange Server, see the *HP ProLiant Application Storage Manager quick setup guide* on the your iSCSI Feature Pack documentation CD.
- Make sure you have an up-to-date backup of your Exchange Server data and logs before starting this procedure or proceeding with any migration.

To access the Host an Exchange Storage Group Wizard

1. In the navigation pane, select **Exchange**.
2. Do one of the following:
 - Right-click any Exchange component in the content pane and select **Host an Exchange Storage Group**.

- From the menu bar, select **Actions>Host an Exchange Storage Group**.
- In the Actions pane, select **Host an Exchange Storage Group**.

The Host an Exchange Storage Group Wizard welcome page opens.

3. Click **Next** to open the Enter an Exchange Server page (see [Entering an Exchange Server name](#)).

Entering an Exchange Server name

Use the Enter an Exchange Server page to provide ASM with the name or the Internet Protocol (IP) address of a remote Exchange Server in your current domain.

1. Do one of the following:
 - Enter the host name of an Exchange Server (exactly as it is registered in the domain).
 - Enter the IP address of an Exchange Server.
2. Click **Next** to open the Select Storage Group Components page (see [Selecting Exchange Server storage group components](#)).

Selecting Exchange Server storage group components

Use the Select Storage Group Components page to select the Exchange Server storage group and storage group components to migrate to the HP ProLiant Storage Server.

1. Select an Exchange Server storage group.
2. Select the components you want to migrate. The default values (already selected) are based on Exchange Server and HP storage best practices. HP recommends you accept these default values; the best practice for log files (not selected) is to keep them on the Exchange Server.

The actions that ASM can perform during migration are:

Action	Description
None	Component cannot be managed by ASM or migrated to the storage server (check box is not selected).
Allocate Space	The data is already on the storage server and can be managed using ASM.
Allocate Space, Move Data	Data will be migrated to the storage server and managed by ASM.
None, Already Managed	Component has been previously migrated and ASM is already managing the component; no action is possible.

3. When you are done, click **Next** to open the Allocate Space page (see [Allocating space for Exchange Server storage group components](#)).

Allocating space for Exchange Server storage group components

Use the Allocate Space page to determine the storage space for each selected Exchange Server component. The default values for RAID Level and Size are based on HP storage and Exchange Server best practices. You can safely accept these values to configure an Exchange Server storage group.

1. Do one of the following:
 - Click **Next** to accept the default values that ASM has provided (recommended). These values are optimized for your Exchange Server.
 - To modify the default values, select a row to edit, and then modify values as necessary. See [Allocating or updating storage space](#) for more information.



NOTE:

To further configure individual storage attributes for each component, click **Advanced**. See [Setting advanced storage allocations](#) for more information.

2. When you are done, click **Next**.

If you requested increased capacity, you might see one of the warning messages described in [Capacity warning messages](#). When you have responded to the messages, the Review Task Summary page opens, summarizing a list of tasks to be performed.

3. Do one of the following:

- To make configuration changes, click **Back**.
- To run tasks immediately, click **Finish**.
- To schedule tasks for later time, select **Schedule tasks to run later**, set the scheduler start time, and then click **Finish**. See [Scheduling storage-allocation tasks](#) for more information.

The Task Viewer opens, running the tasks required to migrate each Exchange Server storage group component.

4. If detailed processing information is not already shown, click **Details**. See [Viewing task completion status](#) for more information.



NOTE:

If you are hosting more than one Exchange Server storage group, repeat the steps above for each storage group.

Using the Create a Shared Folder Wizard

The Create a Shared Folder Wizard walks you through the process of creating a shared folder (file share) on your HP ProLiant Storage Server, including creating or expanding the required storage.

To access the Create a Shared Folder Wizard

1. In the navigation pane, select **Shared Folders**.
2. Do one of the following:
 - Right-click any component and select **Create a Shared Folder**.
 - From the menu bar, select **Actions>Create a Shared Folder**.
 - In the Actions pane, select **Create a Shared Folder**.

The Create a Shared Folder Wizard welcome page opens.

3. Click **Next** to open the Enter a Shared Folder Name and Description page (see [Naming a shared folder](#)).

Naming a shared folder

Use the Enter a Shared Folder Name and Description page to provide ASM with a name and optional description for the shared folder.

1. Enter the share name (folder or directory name) for the shared folder.

**NOTE:**

The path to the shared folder is fixed and based on the shared folder name. The Share Path field is *Read Only*.

2. (Optional) Enter a description of the shared folder.
3. Click **Next** to open the Set Shared Folder Permissions page (see [Setting permissions for a shared folder](#)).

Setting permissions for a shared folder

Use the Set Shared Folder Permissions page to set permissions for network users who access this shared folder.

**NOTE:**

Permissions can be further customized using Windows Explorer. In Windows Explorer, right-click any folder, select **Properties**, and then click the **Sharing** tab.

1. Select a permission level.
2. Click **Next** to open the Allocate space page (see [Allocating space for a shared folder](#)).

Allocating space for a shared folder

Use the Allocate Space page to determine the overall storage space for each shared folder you are configuring. ASM provides default values for RAID Level and Size that you can modify as necessary.

1. Do one of the following:
 - Click **Next** to accept the default values that ASM has provided.
 - To modify the default values, select a row to edit, and then modify values as necessary. (See [Allocating or updating storage space](#) for more information.)

**NOTE:**

To further configure individual storage attributes for each component, click **Advanced**. See [Setting advanced storage allocations](#) for more information.

2. When you are done, click **Next**.

If you requested increased capacity, you might see one of the warning messages described in [Capacity warning messages](#). When you have responded to the messages, the Review Task Summary page opens, summarizing a list of tasks to be performed.

3. Do one of the following:
 - To make configuration changes, click **Back**.

- To run tasks immediately, click **Finish**.
- To schedule tasks to run later, select **Schedule tasks to run later**, set the scheduler start time, and then click **Finish**. See [Scheduling storage-allocation tasks](#) for more information.

The Task Viewer opens, running the tasks required to set up the shared folder.

4. If detailed processing information is not already shown, click **Details**. See [Viewing task completion status](#) for more information.



NOTE:

If you are creating more than one shared folder, repeat the steps above for each folder.

Using the Host a SQL Server Database Wizard

The Host a SQL Server Database Wizard automatically discovers the databases on your SQL Server and helps you allocate storage space for these database components:

- Data file—Contains pointers to database files, storage for system tables and objects, and storage for database data and objects.
- Log file—Holds all the transaction log information for the database. Every database has exactly one log file, which cannot be used to hold any other data.

After it discovers SQL Server databases, ASM helps you configure storage based on SQL Server and HP storage best practices, and migrates the data you requested to your HP ProLiant Storage Server.

Before you begin configuring storage for SQL Server

- Make sure the ASM agent has been installed on each SQL Server with data you plan to migrate. To learn how to install the ASM agent, see the *HP ProLiant Application Storage Manager quick setup guide* on the your iSCSI Feature Pack documentation CD.
- Make sure you have an up-to-date backup of your SQL Server data before starting this procedure or proceeding with any migration.

To access the Host a SQL Server Database Wizard

1. In the navigation pane, select **SQL Server**.
2. Do one of the following:
 - Right-click any component in the content pane and select **Host a SQL Server Database**.
 - From the menu bar, select **Actions>Host a SQL Server Database**.
 - In the Actions pane, select **Host a SQL Server Database**.

The Host a SQL Server Database Wizard welcome page opens.

3. Click **Next** to open the Select a SQL Server page (see [Selecting a SQL Server](#)).

Selecting a SQL Server

Use the Select a SQL Server page to view the SQL Servers that the wizard discovered on your domain.

1. Do one of the following:
 - Select a SQL Server from the drop-down list.

- If no servers have been discovered, enter the host name of the server (exactly as it is registered on the domain) or the IP address of the server.
2. Click **Next** to open Select Database Components page (see [Selecting SQL Server database components](#)).

Selecting SQL Server database components

Use the Select Database Components page to select the SQL Server database and database components to migrate to the HP ProLiant Storage Server.

1. Select a SQL Server database.
2. Select the components you want to migrate. The default values (already selected) are based on SQL Server and HP storage best practices. HP recommends you accept these default values; the best practice for log files (not selected) is to keep them on the SQL Server.

The actions that ASM can perform during migration are:

Action	Description
None	Component cannot be managed by ASM or migrated to the storage server (check box is not selected).
Allocate Space	The data is already on the storage server and can be managed using ASM.
Allocate Space, Move Data	Data will be migrated to the storage server and managed by ASM.
None, Already Managed	Component has been previously migrated and ASM is already managing the component; no action is possible.



NOTE:

ASM cannot migrate system databases; for example, ASM cannot migrate `master`, `model`, `msdb` and `tempdb`.

3. When you are done, click **Next** to open the Select the Database Workload Type page (see [Selecting a database workload type](#)).

Selecting a database workload type

Use the Select the Database Workload Type page to select the application type for this database.



NOTE:

You can only select a database workload type when you first configure a SQL database. If you are modifying storage size allocations for SQL database components after initial configuration, this page is not available.

1. Do one of the following:
 - Select **Transaction processing (TP)** for frequently updated, fast growing databases with large volumes of data requiring concurrent user access.

- Select **Decision support systems (DSS)** for databases designed to handle queries on large amounts of data, typically used for data-mining applications.
2. When you are done, click **Next** to open the Allocate Space page (see [Allocating space for SQL Server database components](#)).

Allocating space for SQL Server database components

Use the Allocate Space page to determine the storage space for each selected SQL Server component. The default values for RAID Level and Size are based on HP storage and SQL Server best practices. You can safely accept these values to configure SQL Server database components.

1. Do one of the following:
 - Click **Next** to accept the default values that ASM has provided (recommended). These values are optimized for your SQL Server.
 - To modify the default values, select a row to edit, and then modify values as necessary. (See [Allocating or updating storage space](#) for more information.)



NOTE:

To further configure individual storage attributes for each component, click **Advanced**. See [Setting advanced storage allocations](#) for more information.

2. When you are done, click **Next**.

If you requested increased capacity, you might see one of the warning messages described in [Capacity warning messages](#). When you have responded to the messages, the Review Task Summary page opens, summarizing a list of tasks to be performed.

3. Do one of the following:
 - To make configuration changes, click **Back**.
 - To run tasks immediately, click **Finish**.
 - To schedule tasks for later time, select **Schedule tasks to run later**, set the scheduler start time, and then click **Finish**. See [Scheduling storage-allocation tasks](#) for more information.

The Task Viewer opens, running the tasks required to migrate each SQL Server database component.

4. If detailed processing information is not already shown, click **Details**. See [Viewing task completion status](#) for more information.



NOTE:

If you are hosting more than one SQL Server database, repeat the steps above for each database.

Using the Host a User-Defined Application Wizard

The Host a User-Defined Application Wizard helps you allocate storage for a remote application on your HP ProLiant Storage Server. As part of this process, the wizard creates a remote iSCSI volume on the application server and enables iSCSI communications between the remote volume and its storage area on the storage server.

Before you begin configuring storage for user-defined applications

- Verify that the remote application that has the following characteristics:
 - Runs under Windows Server 2003
 - Uses NTFS volumes for storage
- Make sure the ASM agent has been installed on each application server with data you plan to host. To learn how to install the ASM agent, see the *HP ProLiant Application Storage Manager quick setup guide* on the your iSCSI Feature Pack documentation CD.

To access the Host a User-Defined Application Wizard

1. In the navigation pane, select **User-Defined**.
2. Do one of the following:
 - Right-click any component in the content pane and select **Host a User-Defined Application**.
 - From the menu bar, select **Actions>Host a User-Defined Application**.
 - In the Actions pane, select **Host a User-Defined Application**.

The Host a User-Defined Application Wizard welcome page opens.

3. Click **Next** to open the Enter an Application Server Name or IP Address page (see [Entering an application server name](#)).

Entering an application server name

Use the Enter an Application Server Name or IP Address page to provide ASM with the name or Internet Protocol (IP) address of a remote application server in your current domain.

1. Do one of the following:
 - Enter the host name of a server (exactly as it is registered in the domain).
 - Enter the IP address of the server.
2. Click **Next** to open the Enter an Application Name page (see [Entering an application name](#)).

Entering an application name

Use the Enter an Application Name page to enter a name for the application whose data will be hosted on the HP ProLiant Storage Server. This name will be used anywhere the application is referenced in ASM, so it must be a *unique* name.

1. Enter a name for the application.
2. Click **Next** to open the Allocate Space page (see [Allocating space for user-defined applications](#)).

Allocating space for user-defined applications

Use the Allocate Space page to determine the overall storage space for the iSCSI remote volume you are configuring. ASM provides default values for RAID Level and Size that you can modify as necessary.

1. Do one of the following:
 - Click **Next** to accept the default values that ASM has provided.
 - To modify the default values, select a row to edit, and then modify values as necessary. See [Allocating or updating storage space](#) for more information.



NOTE:

To further configure individual storage attributes for each component, click **Advanced**. See [Setting advanced storage allocations](#) for more information.

2. When you are done, click **Next**.

If you requested increased capacity, you might see one of the warning messages described in [Capacity warning messages](#). When you have responded to the messages, the Review Task Summary page opens, summarizing a list of tasks to be performed.

3. Do one of the following:

- To make configuration changes, click **Back**.
- To run tasks immediately, click **Finish**.
- To schedule tasks for later, select **Schedule tasks to run later**, set the scheduler start time; and then click **Finish**. See [Scheduling storage-allocation tasks](#) for more information.

The Task Viewer opens, running the tasks required to configure storage for the application data.

4. If detailed processing information is not already shown, click **Details**. See [Viewing task completion status](#) for more information.
5. To complete the configuration of a user-defined application storage area, you must migrate the application data to the HP ProLiant Storage Server. The wizard does not automatically migrate data for user-defined applications.



NOTE:

If you are hosting more than one user-defined application, repeat the steps above for each user-defined application area.

3 Monitoring applications and storage

ASM provides storage-management functions so you can quickly view storage allocations on your HP ProLiant Storage Server. You have a choice of these views:

- Monitoring overall application storage (all applications and shared files)
- Monitoring specific applications and shared folders (such as Exchange Server or SQL Server application storage)
- Monitoring overall storage partitioning (including unallocated space) and storage objects, such as logical disks and volumes.

For status information about each storage component, you can access a properties window with server status (if available) and detailed status information, such as any alerts for cautions or warnings.



NOTE:

ASM rolls up any status alerts to the highest level. For instance, if a nested shared folder has surpassed its percent full warning threshold and exceeded its allocated storage space, a warning message is shown in the top-level share (highest shared folder in the hierarchy) and the shared folder pool (all shared folders). Likewise, if a critical status alert exists in an Exchange Server mail store that alert is also shown in the status for the Exchange Server storage group.

Monitoring applications

Monitor Applications displays all of your applications in one view. Storage information about Exchange Server storage groups, SQL Server databases, user-defined storage, and shared folders is displayed in this view.

- In the navigation pane, select **Monitor Applications**. You can monitor your overall application storage using either:
 - Bar graph view—Click the Bar Graph tab on the right side of the Monitor Applications window to display the storage allocated for each application and shared folder.
 - Pie chart view—Click the Pie Chart tab on the right side of the Monitor Applications window to display the overall storage utilization for all your application storage and shared folders.

For more information about monitoring applications, see:

- [Monitoring Exchange Server storage groups](#)
- [Monitoring shared folders](#)
- [Monitoring SQL Server databases](#)
- [Monitoring user-defined applications](#)

Monitoring Exchange Server storage groups

You can use ASM to monitor the storage used by each Exchange Server storage group component, so that you can manage and grow Exchange Server storage over time.

- In the navigation pane, select **Exchange**.

A table and bar graph are displayed, showing the storage allocated to each Exchange Server storage group, plus monitoring information for components, such as mail stores, public stores, and logs.

Monitoring shared folders

You can use ASM to monitor the total file storage used by a shared folder, so you can easily increase or decrease its storage allocations.

- In the navigation pane, select **Shared Folders**.

A table and bar graph are displayed, showing storage allocated to all shared folders in the HP ProLiant Storage Server *shared folder pool* and to each shared folder.

How ASM discovers shared folders on your HP ProLiant Storage Server

When you install ASM, all top-level shared folders on the storage server are automatically discovered and displayed as ASM proceeds through the directory hierarchy. In addition, ASM discovers any new shared folders that are added at a later date by running the discovery process on a regular basis.



NOTE:

To see any new shares that have been discovered, click **Refresh** in the actions pane.

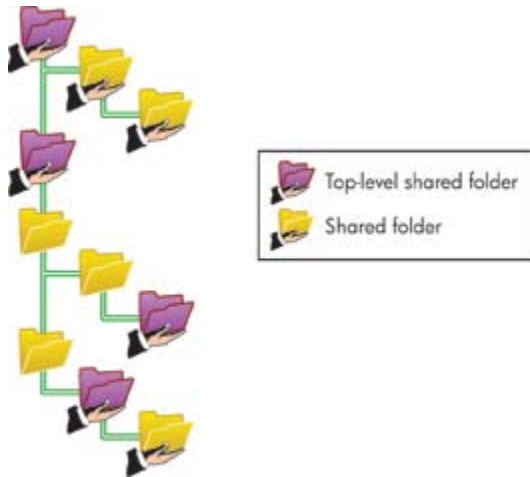


Figure 8 Top-level shared folder example

What to do when a top-level shared folder disappears

A top-level shared folder disappears when you share a folder above it in the hierarchy. The new shared folder becomes the top-level share and any shared folders beneath it are monitored as *nested shares*. To see all nested shared folders in the hierarchy, follow these steps:

1. In bar graph view of the content pane, right-click any shared folder and select **Properties**.
2. Click **Nested Shares** to display a list of nested file shares contained within the shared folder being managed.

Monitoring SQL Server databases

You can use ASM to monitor the storage used by each SQL Server database component, so that you can manage and grow database storage over time.

- In the navigation pane, select **SQL Server**.

A table and bar graph are displayed, showing the storage allocated to each SQL Server database, including data files and logs.

Monitoring user-defined applications

You can use ASM to monitor the storage used by a user-defined application, so you can manage and grow application storage over time.

- In the navigation pane, select **User-Defined**.

A table and bar graph are displayed, showing storage allocated to each application area, space used, space free, and any alerts.

Removing storage components from view

ASM allows you to remove storage components from view if you do not want to monitor them. Although you cannot remove high-level areas from view (such as Exchange Server storage groups), you can remove individual components, (such as the mail stores, public store, or logs in an Exchange Server storage group).

Removing a component from view does not delete or migrate data; rather ASM no longer manages or monitors the component.

To remove a component:

1. Right-click the component to remove.
2. Select **Remove from view**.
3. Click **OK** to confirm the action.



NOTE:

You cannot remove a top-level shared folder from view. Since ASM automatically discovers shared folders on the HP ProLiant Storage Server, the folder would reappear after the next discovery process.

To restore a removed component:

- To restore to view an application storage component, run the appropriate storage-allocation wizard and select the component to add back.



NOTE:

To migrate the application storage components off the HP ProLiant Storage Server, run the Microsoft System Manager Utility on the client application server.

Restrictions for restoring user-defined applications

For user-defined applications, ASM creates a new remote iSCSI volume each time you run the Host a User-Defined Application Wizard. When you remove a user-defined application area from view, you cannot restore the view or resume monitoring and management through ASM. If you rerun the Host a User-Defined Application Wizard with the same application server and server name, the wizard creates a new volume. The original iSCSI volume (the one you removed from view) still exists on the storage server; however, ASM can no longer associate an application with that storage; therefore, ASM cannot restore monitoring capability for the original volume.



CAUTION:

Do not remove a user-defined application area from view if you want to manage that area using ASM in the future.

Monitoring storage

Monitor Storage displays all your storage components in one view. This view is organized by storage components (logical disks and volumes), and displays how application storage and shared-folder data is distributed across your HP ProLiant Storage Server. Additionally, Monitor Storage displays unallocated storage and data on the storage server that is not being monitored.

- In the navigation pane, select **Monitor Storage**.

Accessing storage properties

ASM provides a way to view the properties for storage; you can monitor the following types of storage properties:

- Unallocated space properties (see [Accessing unallocated space properties](#))
 - Volume properties (see [Accessing volume properties](#))
 - Logical disk properties (see [Accessing disk properties](#))
1. In the navigation pane, select **Monitor Storage**, and then select any storage component (such as a logical disk or volume) in the content pane.
 2. Do one of the following:
 - Right-click and select **Properties**.
 - From the menu bar, select **Actions>Properties**.
 - In the Actions pane, select **Properties**.

Accessing unallocated space properties

You can view how much free space you have on your HP ProLiant Storage Server.

- In the bar-graph view of the content pane, right-click **Unallocated** and select **Properties**.

An Unallocated Space Properties dialog box opens and displays information under the following tabs:

- General—Displays the volume name.
- Storage—Displays the unallocated space, used space, free space on the disk, and details of storage allocation.

Accessing volume properties

You can view how much storage is allocated to any volume on your HP ProLiant Storage Server.

- In the bar-graph view of the content pane, right-click any volume name and select **Properties**.

A volume properties dialog box opens and displays information under the following tabs:

- General—Displays the volume name, volume type, status, and alerts.
- Storage—Displays the total space, used space, and free space for the volume, and details for storage allocation.

Accessing disk properties

You can view how much storage is allocated to any logical disk on your HP ProLiant Storage Server.

- In the bar-graph view of the content pane, right-click any disk name and select **Properties**.

A disk properties dialog box opens and displays information under the following tabs:

- General—Displays the logical disk name, disk status, and alerts.
- Storage—Displays logical disk capacity information including total space, used space, free space on the disk, and the system name.

Accessing application properties

ASM provides a way to access the properties for application-server storage, as well as the properties for various application components, such as Exchange Server storage groups or SQL Server databases. Using properties information, you can determine the operating status of any application component, whether it is online or offline, and any warning or critical status indicators.

1. In the navigation pane, select **Applications** and then select a specific application to view, such as Exchange, Shared Folders, SQL Server, or User-Defined. Select any application component in the content pane, such as an Exchange Server storage group, a SQL Server database, or user-defined application area.
2. Do one of the following:
 - Right-click and select **Properties**.
 - From the menu bar, click **Actions>Properties**.
 - In the Actions pane, select **Properties**.

Application properties cascade from high-level properties to component properties. For example, you can right-click an Exchange Server storage group to view all the properties for that group, or you can right-click an Exchange mail store or public store to view the properties for that component.

For more information about properties for supported applications and shared folders, go to:

- [Accessing Exchange Server properties](#)
- [Accessing shared-folder properties](#)
- [Accessing SQL Server properties](#)
- [Accessing user-defined application properties](#)

Accessing Exchange Server properties

ASM provides a way to access the properties for an Exchange Server storage group, as well as the properties for the mail stores, public stores, and log files on your HP ProLiant Storage Server. Using properties information, you can determine the operating status of any Exchange Server component, whether it is online or offline, and any warning or critical status indicators.

1. In the navigation pane, select **Monitor Applications**.
2. Select any Exchange application in the content pane and do one of the following:
 - Right-click and select **Properties**.
 - From the menu bar, select **Actions>Properties**.
 - In the Actions pane, select **Properties**.

Exchange Server properties cascade from storage group properties to mail store, public store, or log file properties. For example, you can right-click an Exchange Server storage group to access all the properties for that group, or you can right-click an Exchange mail store or public store to access the properties for that component.

Accessing Exchange Server storage group properties

1. Select **Exchange**.
2. In the bar graph view of the content pane, right-click any Exchange Server storage group and select **Properties**.
3. Click one of the following tabs:
 - General—Shows the total capacity reserved for the storage group and its operating status:
 - OK—The Exchange Server storage group is running and storage is online.
 - Warning—See the Alerts list for more information.
 - Critical—See the Alerts list for more information.
 - Details—Displays information about the Exchange Server:
 - Server name
 - System path
 - Circular logging (yes/no)
 - Storage valid (yes/no)

Accessing Exchange Server component properties

You can access properties for an Exchange Server components (such as a mail store, public store, or log).

1. Select **Exchange**.
2. In the bar graph view of the content pane, right-click any component and select **Properties**.
3. Click one of the following tabs:
 - General—Displays the Exchange Server area name (or component name), type, server name, storage group, and area status:
 - OK—The Exchange Server component is running and storage is online.
 - Warning—See the Alerts list for more information.
 - Critical—See the Alerts list for more information.
 - Storage—Displays the Exchange Server storage space, including allocated space, used space, free space, and details for storage allocation.
 - Warning Threshold—Allows changes to the Percent Full Warning Threshold. See [Setting a warning threshold for storage components](#) for more information.

**NOTE:**

Depending on whether the storage component is a mail store, public store, or log, follow the instructions below:

- For mail stores, select the **MailStore Database** tab for capacity planning and detailed information about the Exchange mail store.
- For public stores, select the **PublicStore Database** tab for capacity planning and detailed information about the Exchange public store.
- For logs, select the **Logs** tab for capacity planning and detailed information about the Exchange log.

Accessing shared-folder properties

ASM provides a way to access the properties for shared folders. Using properties information, you can determine details about shared-folder status, including allocated space, and nested shares (if any), whether shared-folder storage is online or offline, and any warning or critical status indicators.

1. Select **Shared Folders**.
2. In the content pane, select any shared folder and do one of the following:
 - Right-click and select **Properties**.
 - From the menu bar, select **Actions>Properties**.
 - In the Actions pane, select **Properties**.

Shared-folder properties cascade from properties for the shared folder pool (all shared folders monitored by ASM) to properties for individual shared folders. See [Monitoring shared folders](#) for more information about nested shared folders.

Accessing properties for the shared folder pool

1. Select **Shared Folders**.
2. In the bar-graph view of content pane, right-click **Shared Folders** (shows status for all shared folders that ASM monitors) and select **Properties**.
3. You see the following information under this tab:
 - General—Shows the total storage space reserved for the shared file pool and file sharing status:
 - OK—Shared folder storage is below the percent full warning threshold set for the application.
 - Warning—Shared folder storage has exceeded the percent full warning threshold.
 - Critical—Shared folder storage has exceeded the allocated storage limit and alerts are shown. See [Enforcing an allocated storage limit for shared folders](#) for more information

Accessing properties for a shared folder

1. In bar graph view of the content pane, right-click any shared folder and select **Properties**.
2. Click one of the following tabs:
 - General—Shows the share name, share type, share path, and share comment for the shared folder and its operating status:

- OK—The storage is online.
- Warning—The storage has surpassed the percent full warning threshold. See the Alerts list for more information.
- Critical—Shared folder storage has past the allocated storage limit and alerts are shown. See the Alerts list for more information; see also [Enforcing an allocated storage limit for shared folders](#).
- Storage—Displays the shared folder storage space, including allocated space, used space, free space, and details for storage allocation.
- Limits—Allows the enforcement of the allocated space limit and changes to the percent full warning threshold. See [Enforcing an allocated storage limit for shared folders](#).
- Nested Shares—Displays a list of nested file shares (if any) contained within the shared folder being managed.

Enforcing an allocated storage limit for shared folders

ASM provides a way to enforce an allocated storage limit for shared folders. If enforced, the system does not allow the amount of allocated space to be exceeded for the folder you specify. You can also assign a warning so that when the capacity reaches the threshold, the file folder status changes from *OK* to *Warning*. And if necessary, you can use Microsoft Event Viewer (part of the Windows operating system) to generate a notification message informing administrators or end users that storage capacity is about to be exceeded.

If the capacity of the file folder surpasses the warning threshold and reaches the allocated space limit, the file folder status changes from *Warning* to *Critical* in the content pane, and users are blocked from adding data to this shared folder.



NOTE:

If you do not enforce an allocated storage limit for shared folders, the ASM status indicator goes from *Warning* to *Critical* in the content pane; however, users are not blocked from adding more storage to the folder.

To set Enforce Allocated Limit (Quota) in the Advanced window:

1. In the navigation pane, select **Shared Folders**.
2. In the actions pane, select **Allocate Space**.
3. In the Allocate Space page, click **Advanced**.
4. Set the Enforce Allocated Limit (Quota) option to **Yes**.
5. Click **OK**.

To set Enforce Allocated Limit (Quota) by modifying shared folder properties:

1. In the content pane, select a shared folder.
2. From the menu bar, select **Actions>Properties**.
3. Click the **Limits** tab.
4. Select the Enforce allocated space limit check box.
5. Click **Apply**.

6. Click **OK**.

For more information, see [Setting a warning threshold for storage components](#).

Accessing SQL Server properties

ASM provides a way to access the properties for a SQL Server, as well as the properties for the SQL Server databases, data files, and log files on your HP ProLiant Storage Server. Using properties information, you can determine the operating status of any SQL Server database component, whether it is online or offline, and any warning or critical status indicators.

1. Select **Monitor Applications**.
2. Select any SQL Server application in the content pane and do one of the following:
 - Right-click and select **Properties**.
 - From the menu bar, select **Actions>Properties**.
 - In the Actions pane, select **Properties**.

SQL Server properties cascade from database properties to data file and log file properties. For example, you can right-click a SQL Server database to access all the properties for that database, or you can right-click a data file to access the properties for that file.

Accessing SQL Server database properties

1. Select **SQL Server**.
2. In the bar graph view of the content pane, right-click any SQL Server database and select **Properties**.
3. Click one of the following tabs:
 - General—Identifies the status of the SQL Server database:
 - OK—The database is running and storage is online.
 - Warning—See the Alerts list for more information.
 - Critical—See the Alerts list for more information.
 - Details—Displays information about the SQL Server database:
 - SQL Server name
 - Version
 - Database status
 - Workload type
 - Clustered (yes/no)
 - Storage valid (yes/no)
 - SQL Server status, which is one of the values in the table below.

Status indicator	Value
Emergency Mode	Emergency mode has been initiated.
Loading	Database loading is underway.
Normal	Database is available for use.
Offline	Database has been placed offline by a system or user action.
Recovering	Database recovery is underway.

Status indicator	Value
Standby	Database is referenced on a standby server.
Suspect	Database integrity is suspect.



NOTE:

The messages above do not originate from ASM or from your storage server; they are generated by the SQL Server. For more information about these messages or for troubleshooting, go to the Microsoft SQL Server 2000 server web site at <http://www.microsoft.com/sql> and click **Support**.

Accessing SQL Server component properties

You can access properties for an SQL Server component (such as a data file or log).

1. Select **SQL Server**.
2. In the bar graph view of the content pane, right-click any SQL Server data file or log and then select **Properties**.
3. Click one of the following tabs:
 - **General**—Displays the SQL Server area name (component name), area type, server name, data base name, and areas status:
 - **OK**—The storage is online
 - **Warning**—See the Alerts list for more information.
 - **Critical**—See the Alerts list for more information.
 - **Storage**—Displays the storage space for the SQL Server data file or log, including allocated space, used space, free space, and details of storage allocation.
 - **Warning Threshold**—Allows you to change the Percent Full Warning Threshold. See [Setting a warning threshold for storage components](#).



NOTE:

Depending on whether the storage component is a SQL Server data file or a SQL Server log file, follow the instructions below:

- For SQL Server data files, select the **Data File** tab for capacity planning and detailed information about the SQL Server data file.
- For SQL Server log files, select the **Log** tab for capacity planning and detailed information about the SQL Server log file.

Accessing user-defined application properties

ASM provides a way to access the properties for user-defined applications. Using properties information, you can determine the status of all user-defined applications monitored by ASM, and any warning or critical status indicators.

1. Select **Monitor Applications**.

2. Select any user-defined application in the content pane and do one of the following:
 - Right-click and select **Properties**.
 - From the menu bar, select **Actions>Properties**.
 - In the Actions pane, select **Properties**.

User-defined application properties cascade from properties for all user-defined application storage to properties for individual user-defined storage areas.

Accessing properties for all user-defined applications

1. Select **User-Defined**.
2. In the bar-graph view of content pane, right-click **User-Defined Applications** (shows status for all user-defined applications that ASM monitors) and select **Properties**.
3. You see the following information under this tab:
 - General—Shows the total storage space reserved for the user-defined application and its operating status:
 - OK—Application storage is below the percent full warning threshold set for the application and iSCSI communication exists between the application storage and the agent on the application server.
 - Warning—See the Alerts list for more information.
 - Critical—See the Alerts list for more information.

Accessing properties for a user-defined area

1. Select **User-Defined**.
2. In the bar graph view of the content pane, right-click any user-defined storage area (iSCSI volume) and select **Properties**.
3. Select one of the following tabs:
 - General—Identifies the status of the storage for the application server:
 - OK—The storage is online.
 - Warning—See the Alerts list for more information.
 - Critical—See the Alerts list for more information.
 - Storage—Displays the storage space for the application server, including allocated space, used space, free space, and details of storage allocation.
 - Warning Threshold—Allows you to change the percent full warning threshold. See [Setting a warning threshold for storage components](#).

A Troubleshooting

This Appendix provides troubleshooting information.

SQL Server errors

Host a SQL Server Database Wizard authentication error

Problem: While using the Host a SQL Server Database Wizard, you receive an error message informing you that ASM cannot authenticate with the SQL Server.

Solution: Each SQL Server instance must have a login for the local user called ASMUser with the server role defined as System Administrators. This login is created during the installation of the ASM agent on the SQL Server; however, if a new SQL Server instance is created after the installation of the agent, this login will *not* be configured.

To fix this problem, remove the ASM agent from the SQL Server, and then reinstall it (no information will be lost). Or, manually enter the login by following these steps:

1. Open SQL Server Enterprise Manager.
2. Connect to the SQL Server whose data you want to store on the HP ProLiant Storage Server.
3. Select the Security Folder.
4. Select **Logins**.
5. Select **New Login**.
6. In the Name field, enter the following: **ASMUser**
7. In the Domain field, enter the domain name for the SQL Server.
8. Select the Server Roles tab
9. Select the **System Administrators** server role and click **OK**.

B HP technical support

Telephone numbers for worldwide technical support are listed on the following HP web site: <http://www.hp.com/support>. From this web site, select the country of origin. For example, the North American technical support number is 800-633-3600. For continuous quality improvement, calls may be recorded or monitored.

Be sure to have the following information available before calling:

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Operating system type and revision level
- Detailed, specific questions

HP storage web site

This HP web site has the latest information on this product, as well as the latest drivers. Access the storage site at <http://www.hp.com/country/us/eng/prodserv/storage.html>. From this web site, select the appropriate product or solution.

HP NAS services web site

The HP NAS Services site allows you to choose from convenient HP Care Pack Services packages or implement a custom support solution delivered by HP ProLiant Storage Server specialists or our certified service partners. For more information see us at http://www.hp.com/hps/storage/ns_nas.html.

Glossary

This section defines the terms used to describe the ASM user interface and program features.

Actions pane	The right pane in the main window of the ASM user interface that provides a list of actions, based on your current selection. Along with other selectable items, the actions pane provides access to storage-allocation wizards and the Allocate Space page, which help you configure storage. Select an application in the navigation pane (left pane) to see its corresponding wizard in the actions pane (right pane). See also navigation pane and content pane .
Advanced window	A window accessed by clicking the Advanced button in any of the storage-allocation wizards or the Allocate Space page that allows you to configure storage options beyond the defaults that ASM provides.
Allocated space	Storage space that is being used by, or reserved for, application or file data.
Area	A generic term for a type of storage-component information you can monitor using the ASM user interface. For example, Exchange Server storage group <i>areas</i> display storage-size allocations for individual mail stores, public stores, or log files.
ASM Agent	Software installed on a client application server that provides application-specific data to ASM. To configure storage for managed applications, such as Exchange Server, SQL Server, you must first install the appropriate ASM agent on the application server.
Bar graph view	A graphical representation of all application storage monitored by ASM. To access the bar graph view, select Monitor Applications in the navigation pane; the Bar Graph view is displayed in the lower half of the content pane. See also Pie chart view .
Content pane	The center pane in the main window of the ASM user interface that provides monitoring of storage utilization for application storage components and shared folders. Select an application in the navigation pane (left pane) to see its monitoring data in the content pane (center pane). See also navigation pane and actions pane .
Create a Shared Folder Wizard	An ASM wizard that assists you with setting up shared folders on the HP ProLiant Storage Server with data to be accessed by network users. Automated data migration is not an option for shared folders.
Data migration	In ASM, transferring application data from the client application server to the HP ProLiant Storage Server. For managed applications, such as Exchange Server and SQL Server, data migration can be scheduled to take place automatically through the appropriate storage-allocation wizard (such as the Host an Exchange Storage Group Wizard). For user-defined applications and shared folders, you must migrate data manually. See also hosting .
Disk striping	In computers that use multiple hard disk systems, the process of dividing a body of data into blocks and spreading the data blocks across several partitions on several hard disks. Each stripe is the size of the smallest partition. For example, if three partitions are selected with one partition equaling 150 megabytes (MB), another 100 MB, and the third 50 MB, each stripe will be 50 MB in size. (From http://searchstorage.techtarget.com/ .)
Exchange data	Data on an Exchange Server (mail stores, public stores, or logs) that can be migrated to and managed by ASM.

Exchange Server storage group	A collection of mail stores and public stores that share a set of transaction log files.
Exchange wizard	See Host an Exchange Storage Group Wizard .
Exclusive storage	The option to use separate, dedicated physical disk drives for a storage component, which cannot be used by any other storage. Set this option using the Advanced window .
File share collection	A collection of shared directories.
Host an Exchange Storage Group Wizard	An ASM wizard that assists you with setting up storage for Exchange Server storage groups on the HP ProLiant Storage Server. As part of this process, the wizard allows you to schedule automated data migration.
Host a SQL Server Database Wizard	An ASM wizard that assists you with setting up storage for SQL Server databases on the HP ProLiant Storage Server. As part of this process, the wizard allows you to schedule automated data migration.
Host a User-Defined Application Wizard	An ASM wizard that assists you with setting up storage for applications with user-defined storage characteristics. Automated data migration is not an option for user-defined applications.
Hosting	Configuring storage for an application server on the HP ProLiant Storage Server. For example, you can host the following on the storage server: Exchange Server storage groups, SQL Server databases, and iSCSI volumes for user-defined applications. See also data migration .
Hot spares	One or more disk drives that are held in reserve in case of disk failure. The Advanced window allows you to select a hot spares value of 0–2.
HP ProLiant Storage Server iSCSI Feature Pack	Software that adds iSCSI target functionality to HP ProLiant Storage Servers. The result is a single-source platform delivering file, print, and block services.
iSCSI	Internet SCSI (Small Computer System Interface), an Internet Protocol (IP)-based storage networking standard for linking data storage facilities, developed by the Internet Engineering Task Force (IETF). By carrying SCSI commands over IP networks, iSCSI is used to facilitate data transfers over intranets and to manage storage over long distances. The iSCSI protocol is among the key technologies expected to help bring about rapid development of the storage area network (SAN) market, by increasing the capabilities and performance of storage data transmission. (From http://searchstorage.techtarget.com/ .)
Log	A file that maintains a record of every message stored in a database, and provides fault tolerance in the event that a database must be restored.
Logical storage	All storage constructs above physical storage, but below a file system directory. This includes volumes, logical disks, virtual arrays, iSCSI LUNs, iSCSI pools, and iSCSI file devices.
Mail store	The part of the Microsoft web storage system that maintains data in mailboxes.
Managed applications	Applications, such as Exchange Server and SQL Server, in which ASM can discover storage components for the application and knows how to store them. For managed applications, you use a storage-allocation wizard (such as the Host an Exchange Storage Group Wizard or the Host a SQL Server Database Wizard) to configure storage. The wizard allows you to schedule automated data migration of application data. Contrast with user-defined applications .
Menu bar	The horizontal menu located at the top of the ASM user interface. In ASM, the menu bar provides these menus: file, actions, tools, and help.

Navigation pane	The left pane in the main window of the ASM user interface that allows you to select different applications and storage areas to monitor or configure. Select an application in the navigation pane (left pane) to see its monitoring data in the content pane (center pane). See also content pane and actions pane .
Percent full warning threshold	A status indicator that warns you when storage use is about to surpass the percentage you enter. For example, you can set the percent full warning threshold at 90% and you will receive a warning when storage is at 90% full. Set this threshold using the Advanced window or a Properties window.
Physical storage	All storage residing on mechanical disk drives.
Pie chart view	Pie chart representation of application storage space monitored by ASM. To access the pie chart view, select Monitor Applications in the navigation pane, and then select the Pie Chart tab in the lower half of the content pane. See also bar graph view .
Public store	The part of the Microsoft web storage system that maintains data in public folders.
RAID	Redundant Array of Independent Disks. Disk formatting to provide different levels of performance and fault-tolerance across physical disks. The Advanced window allows you to select from supported levels of RAID.
RAID stripe size	The number of bytes or kilobytes to be <i>striped</i> across RAID disks. The Advanced window allows you to select a RAID stripe size of small, medium, or large. See also RAID and disk striping .
Scaling	Changes the display proportions of application components in the content pane, such as logical disks and volumes, and application areas. To scale application components, select Tools>Options.
Share	A resource such as data or a device made available for use by users on other computer systems. See also shared folders .
Shared folders	File folders on the HP ProLiant Storage Server that are set up to be accessible to network users. You create shared folders using the Create a Shared Folder Wizard; however, you must manually migrate the data to the storage server and communicate where the data has been stored to network users. To use ASM to monitor and configure shared folders, select Shared Folders in the navigation pane. See also share .
Shared folder wizard	See Create a Shared Folder Wizard .
Size	The amount of storage that ASM allocates for the storage component you are configuring. To change the size of any storage component, select the component in the content pane; in the actions pane, select Allocate Space .
SQL wizard	See Host a SQL Database Wizard .
Status bar	The area located at the bottom of the ASM user interface that displays server information and system alerts.
Storage capacity bars	Displays the allocated space and capacity used in the bar graph view of the content pane. See also bar graph view and content pane .
Storage group	See Exchange Server storage group .
Striping	See disk striping .
Task Viewer	A window that displays the status of current tasks, errors, and task history. To see the Task Viewer, select Tools>Task Viewer.
Threshold	See percent full warning threshold .

Toolbar	The area below the menu bar that contains icons for commonly-used commands.
Top-level share	First shared folders in a directory hierarchy.
Unallocated space	Storage space that is not being used or reserved for application data.
User-defined applications	Generic applications with storage characteristics that must be specified by the user. A user-defined application can be any remote application that runs under Windows Server 2003 and uses NTFS volumes for storage. For user-defined applications, you use the Host a User-Defined Application Wizard to configure storage; however, you must manually migrate data to the HP ProLiant Storage Server. Contrast with managed applications .
Volumes	A partition containing a file system.
Warning threshold	See percent full warning threshold .
Windows Storage Server 2003	Microsoft-dedicated file server software.

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